

N

Trial Examination 4

20

Duration: 30 minutes

For each question, choose the most suitable option and write the letter (A, B, C or D) in the brackets provided. Each correct answer will score one mark.

1. Which apparatus below are **not** used in the set-up for removing water from magnesium chloride solution?

- 1 Condenser
- 2 Distillation flask
- 3 Filter funnel
- 4 Separating funnel
- 5 Thermometer

A 1, 2 and 5 only
B 1, 3 and 5 only
C 2, 3 and 4 only
D 3 and 4 only

2. Two samples of food dyes, **A** and **B**, were analysed using paper chromatography. Figure 1 shows the chromatogram obtained.

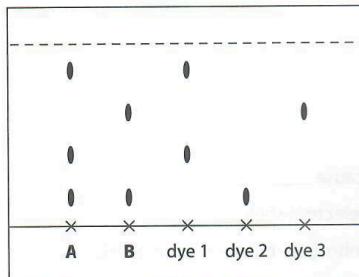


Figure 1

Which of the following statements is **true**?

A **A** is a compound while **B** is a mixture.
B **B** is a compound while **A** is a mixture.
C Both **A** and **B** are compounds.
D Both **A** and **B** are mixtures.

3. A mixture of gases was passed through the following set-up in Figure 2.

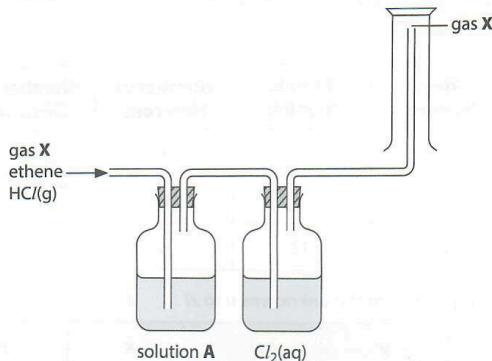


Figure 2

Which of the following statements is **not true** of the set-up above?

- A Ethene reacts with aqueous chlorine.
- B Gas X could be hexane, C₆H₁₄.
- C Gas X could be hydrogen.
- D Solution A could be sodium hydroxide.

()

4. Iodine sublimes whereas water evaporates.

Which of the following is most likely **not true** of the state changes of iodine and water?

- A Both substances undergo state changes to form a gas.
- B In both state changes, the intermolecular forces of attraction are overcome.
- C Iodine has weaker covalent bonds as compared to water.
- D The particles of iodine move further apart during sublimation compared to the particles of water during evaporation.

()

5. Which of the following shows the **correct** similarity and difference between hydrogen, ¹H, and its isotope, ²H?

	Similarity	Difference
A	Both nuclei contain neutrons.	¹ H has more neutrons than ² H.
B	Both nuclei contain the same number of electrons.	² H has more neutrons than ¹ H
C	Both nuclei contain the same number of neutrons.	¹ H has more neutrons than ² H.
D	Both nuclei contain the same number of protons.	² H has more neutrons than ¹ H.

()

6. Table 1 shows information on three ions, **A**, **B** and **C**. Ions **A** and **B** belong to elements which are beside each other in the periodic table. Ions **B** and **C** are isotopes.

Table 1

Particle	Mass Number	Atomic Number	Number of Neutrons	Number of Electrons	Charge
A	23	<i>v</i>	<i>w</i>	<i>x</i>	+1
B	<i>u</i>	<i>w</i>	13	<i>y</i>	<i>z</i>
C	24	12	<i>w</i>	<i>y</i>	<i>z</i>

Which of the following represent the unknowns *u* to *z*?

	<i>u</i>	<i>v</i>	<i>w</i>	<i>x</i>	<i>y</i>	<i>z</i>
A	24	11	12	11	12	+2
B	24	13	11	10	10	+3
C	25	11	12	10	10	+2
D	26	12	13	10	12	+2

()

7. Element **X** is from Group 13 whereas element **Y** is from Group 16 of the periodic table.

Which of the following could be **true** of the compound formed between **X** and **Y**?

	Number of Electrons Involved in Bonding	Type of Bonding	Relative Molecular Mass of the Compound
A	3	Covalent	43
B	3	Ionic	59
C	6	Covalent	150
D	6	Ionic	102

()

8. Alloys are formed primarily to _____.

- A** allow the metal to conduct electricity better
- B** make the metal look more appealing
- C** prevent the metal from corroding
- D** strengthen the metal

()

9. Some information regarding unknown compounds WO_2 , XF_3 , YCl and $Z(NO_3)_2$ are given in Table 2.

Table 2

Compound	Number of Moles / mol	Mass / g
WO_2	0.500	22.0
XF_3	0.150	12.6
$YC\ell$	0.400	29.8
$Z(NO_3)_2$	0.100	14.8

Arrange **W** to **Z** in **ascending** order of number of valence electrons.

A W, X, Z, Y
B W, Y, X, Z
C Y, Z, X, W
D Z, Y, X, W

10. When compound **D** reacts with alkali **E**, gas **F** is formed.

Which of the following could be the formulae of **D**, **E** and **F**?

	D	E	F
A	Al_2O_3	NaOH	H_2O
B	CaO	NH_3	NH_3
C	NH_4Cl	KOH	HCl
D	$(NH_4)_2SO_4$	NaOH	NH_3

11. The reaction between ethanoic acid and magnesium can be represented using the following equation.



Which of the following change(s) will produce the **same** observation as the reaction above?

1 Copper is used instead of magnesium
 2 Ethanoic acid is dissolved in an organic solvent like benzene instead of water
 3 Magnesium carbonate is used instead of magnesium
 4 Magnesium oxide is used instead of magnesium
A 1 and 2 only
B 1 and 4 only
C 2 and 3 only
D 3 only

12. Some experiments were done on substances **D**, **E** and methane. The gases produced from the experiments were tested. Table 3 shows the experiments and the observations of the tests done on these substances.

Table 3

Experiment	Procedure	Observation
1	Heat compound D strongly in a test tube.	The gases produced turned damp red litmus paper blue, and then turns it back to red.
2	Burn methane in excess oxygen.	?
3	Add substance E to nitric acid.	?

Which of the following is most likely **not true**?

A Damp red litmus paper can be used to identify the gas produced in experiment 2.
 B If substance **E** is zinc, a burning splint can be used to test for the gas produced.
 C If substance **E** is zinc carbonate, the gas produced is the same as in experiment 2.
 D Substance **D** could be ammonium chloride.

()

13. Which of the following is **not** the correct trend across Period 3 of the periodic table?

A The metallic character of the elements decreases
 B The number of valence electrons of the elements increases
 C The reactivity of the elements decreases
 D The tendency to form acidic oxides increases

()

14. Which of the following ionic equations is **incorrect**?

A $\text{Br}_2 + 2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{Br}^-$
 B $\text{Br}_2 + 2\text{I}^- \rightarrow \text{I}_2 + 2\text{Br}^-$
 C $\text{Cl}_2 + 2\text{Br}^- \rightarrow \text{Br}_2 + 2\text{Cl}^-$
 D $\text{Cl}_2 + 2\text{I}^- \rightarrow \text{I}_2 + 2\text{Cl}^-$

()

15. The formula of a compound of sulfur is SV_2 . It is a gas at room temperature.

Which of the following statements could be **true**?

- 1 Element V could be a Group 17 element.
- 2 Element V could be sodium.
- 3 The compound contains ions.
- 4 The compound could be a pollutant.

A 1 and 2 only
B 1 and 4 only
C 2 and 3 only
D 3 and 4 only

16. A displacement experiment was done on some unknown metals, O, P, Q and R.



Based on the ionic equations above, which of the following ionic equations is **wrong**?

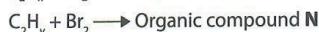
A $Q + P^{2+} \longrightarrow Q^{2+} + P$
B $Q + 2R^{+} \longrightarrow Q^{2+} + 2R$
C $2R + O^{2+} \longrightarrow 2R^{+} + O$
D $2R + P^{2+} \longrightarrow 2R^{+} + P$

17. Bioethanol is preferred over conventional fuels like petrol and diesel.

This is because _____.

A it does not produce harmful gases when burnt
B it is a renewable resource
C it is easily obtained from petroleum
D its production incurs low costs

18. Compounds C_2H_x and C_2H_y undergo reactions with bromine as shown below.



Organic compound M contains more bromine atoms than organic compound N.

Which of the following regarding the above reactions are **correct**?

- 1 A by-product is formed when compound M is formed.
- 2 Both C_2H_x and C_2H_y can be obtained from a larger hydrocarbon molecule.
- 3 The number of hydrogen atoms in organic compound N is less than number of hydrogen atoms in organic compound M.
- 4 $y = x + 2$

A 1 and 3 only
B 1 and 4 only
C 2 and 3 only
D 2 and 4 only

()

19. The structure of compound P is shown in Figure 3. Compound P can undergo polymerisation.

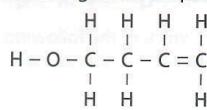
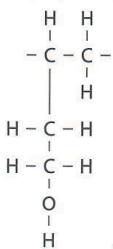


Figure 3

Which of the following statements is/are **true**?

- 1 Carbon–hydrogen bonds are broken during polymerisation.
- 2 The repeat unit of the polymer is



- 3 Cracking could be used to break down and recycle the polymer.
- 4 The public should be educated on the proper disposal and usage of the polymer to prevent more pollution caused by its improper disposal.

A 1 only
B 1 and 2 only
C 2, 3 and 4 only
D 3 and 4 only

()

20. Figure 4 shows the volume of air pollutants produced by a car engine based on the volume of air taken in by the engine.

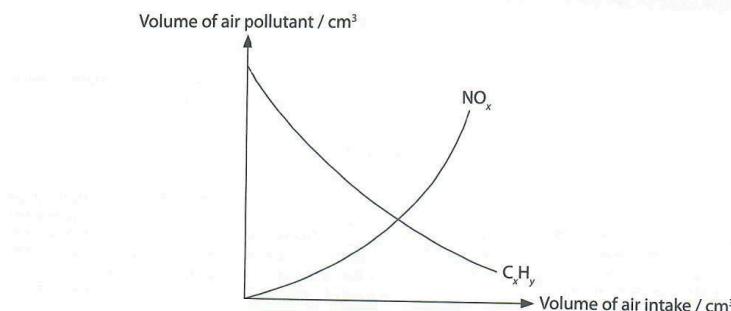


Figure 4

Which of the following statements is/are most likely **true**?

- 1 The graph of carbon monoxide produced would look similar to the graph of nitrogen oxides produced.
- 2 When the intake of air is high, more complete combustion occurs.
- 3 When the intake of air is high, the volume of nitrogen oxides removed by catalytic converters decreases.
- 4 When the intake of air is low, the temperature of engine is low.

A 1 only
B 1, 2 and 3 only
C 2, 3 and 4 only
D 3 and 4 only